A LIBRARY OF SOFTWARE FOR APPLE II SERIES COMPUTERS

A+DISK

USER'S MANUAL VOL. 1 NO. 4 $34.95

SEVEN NEW PROGRAMS *ON DISKETTE*

- HI-RES SAILBOAT: LET YOUR MICRO HELP YOU SAIL
- STATES AND CAPITALS: MASTER U.S. GEOGRAPHY WITH GRAPHICS

PLUS FIVE MORE . . .
SEE BACK COVER

FROM THE EDITOR

Are you computer literate? The question doesn't yet dominate cocktail party conversation, but it does address one of society's fastest-growing, non-medical anxieties. With the continuing encroachment of computers into all aspects of our lives, the fear of becoming functionally illiterate, of being unable to survive in a computer-based society, has grown. The media's tremendous attention to computer developments and their implications has subtly nurtured our fears of our own impending obsolescence, and worse still, our fears of raising non-competitive children.

Certainly the computer revolution is here; yet much of the attendant talk about computer literacy has missed the point. With other technological innovations as a model, attention has been focused on the new skills that will be required to operate computers, fostering the extreme conclusion that we will all need to learn to program. The computer, however, is unique in its inherent flexibility both in terms of what it can be used for, and how it can be applied to those uses. It is this latter flexibility in operation, often referred to as the "user interface", that reveals the erroneous interpretation of computer literacy as technical mastery. People do not have to be molded to suit the way a computer operates; rather the computer must be molded to the way people work.

The key to achieving this freedom is software, and it is one of the most exciting challenges of *A+ Disk Magazine*. Since we publish such a large volume of software, and try to reach the broadest audience possible, we are tremendously concerned with finding and designing programs that are truly easy to use. We are continuously refining our ideas about the natural logic of a program's operation, the simplest means of running a program, the most effective way of providing help, and related issues. Even though we are not inventing new kinds of user interface (we await the natural language interface as eagerly as everyone else), we nevertheless have a special opportunity and responsibility to develop superior standards within the limits of existing software technology.

To do so, we need your help. After all, you are the ones who use our software. Let us know what you think of the programs, how easy they are to learn and use. Are the programs logically designed? Do they perform useful tasks? Is their operation simple and consistent? Do they provide adequate error handling and help information? Is the documentation clear and complete? Give us the benefit of your criticisms and suggestions. With your help we can realize the proper meaning of "computer literacy"—knowing what a computer can do, not how to do it.

Morris L. Effron

2D.2013M

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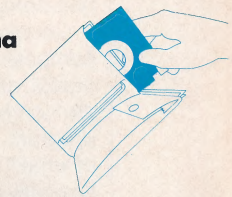

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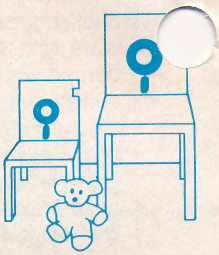

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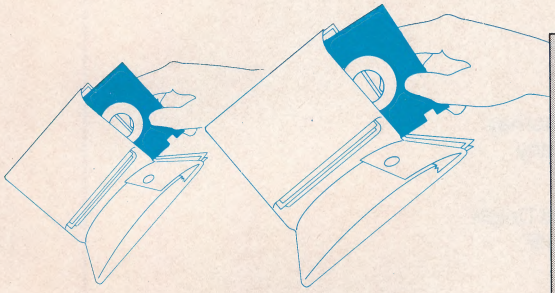

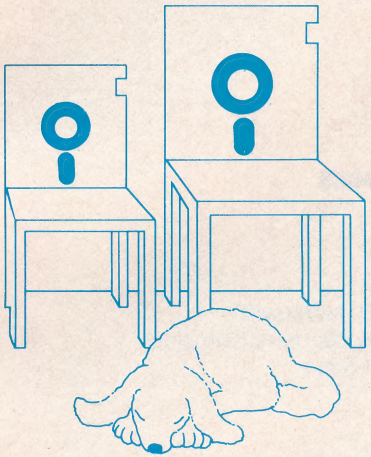

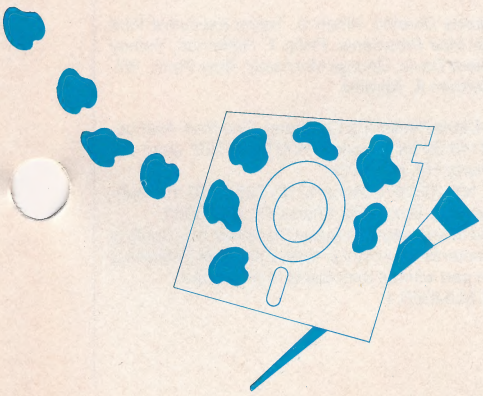

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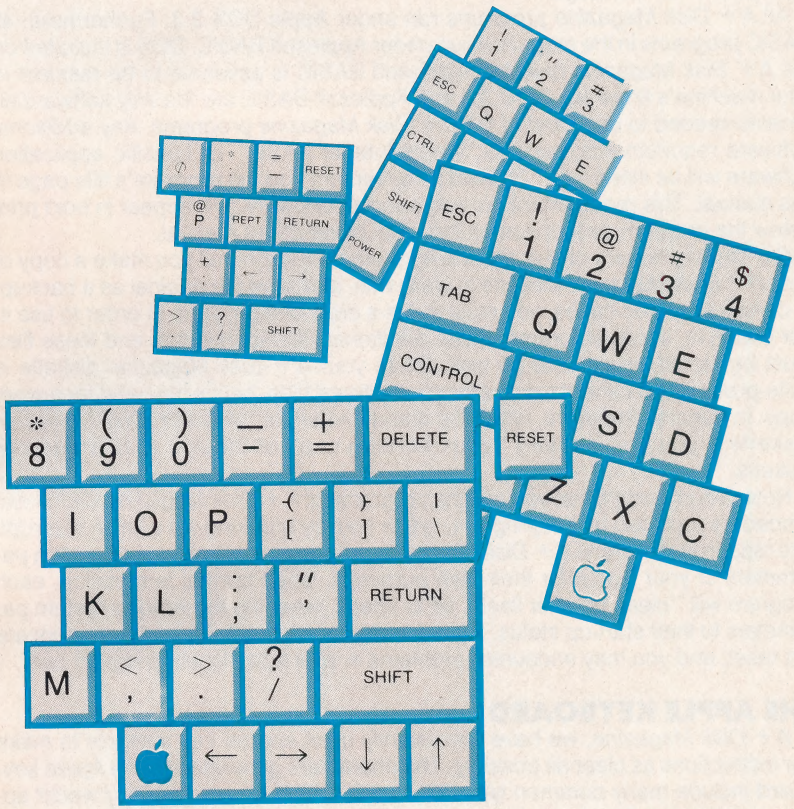
TECHNICAL PREFACE



To help our readers make the most of A+ Disk Magazine, *we would like to provide some background information concerning the editorial diskette, the accompanying manual, and how to use both. We don't expect all of the following topics to interest all our readers. Nevertheless, we prefer to err on the side of comprehensive support rather than leave any of our readers confused. So we encourage everyone to at least skim this section to assure a solid background for the use of* A+ Disk Magazine.

USAGE REQUIREMENTS

A+ Disk Magazine has been designed for use on any Apple II, II+, or IIe personal computer with at least 48K of main memory and the following minimum hardware

requirements: a keyboard, a monitor, and a disk controller with at least one disk drive. The display unit can be either a monochrome monitor, a color monitor, or an RF Modulator and TV set. All software is designed for a 40 column display, so that an 80 column card is not needed.

This equipment is all you need to run the majority of *A+ Disk Magazine* software. Wherever possible, we make any other hardware optional. When on occasion a program's operation necessitates additional equipment, the manual will list this component as a "Special Requirement" on the program's title page.This requirement will also appear in bold print below the program description on the back side of our package.

All *A+ Disk Magazine* programs run under Apple DOS 3.3. Furthermore, all BASIC programs in the magazine run under Applesoft BASIC. DOS is included on the *A+ Disk Magazine* diskette. Applesoft BASIC is assumed to be resident in your machine's firmware. DOS 3.3 and Applesoft BASIC are the only software elements needed to use most of the *A+ Disk Magazine* programs. Any additional software requirements, such as "Apple Integer BASIC" or specific application software will be listed as a "Special Requirement" on the program's title page in this manual. This requirement, as with special hardware, will appear in bold print below the program description on the back cover of our manual.

Our closing remark on this topic is a recommendation that you make a copy of your *A+ Disk Magazine* diskette to work with, and save the original as a backup. In certain specified cases, you must make a copy of a program in order to use it. For example, some programs create additional files as they run, and these files must be stored on diskette as well. Since your *A+ Disk Magazine* diskette is write-protected, it cannot receive these additional files, hence the need for a work copy. In general, therefore, when the manual refers to "your *A+ Disk Magazine* diskette," you should read "your working copy of the *A+ Disk Magazine* diskette."

Note: It is important that you exit the programs of *A+ Disk Magazine* via the exit procedure provided by the program, rather than by breaking out with an interrupt. The reason is that many *A+ Disk Magazine* programs reset various operating parameters of your Apple for their own purposes. Upon normal termination, each program will "clean up after itself" so to speak, resetting the various system parameters to their start-up status. If you interrupt a program, these parameters are not reset, and you may encounter problems in your subsequent program use.

THE APPLE KEYBOARD

In *A+ Disk Magazine*, we have consistently used special key symbols to make our instructions as clear as possible. The characters generated by the Apple keyboard include many common typewriter keys, which we print as they would appear when typed. The Apple keyboard's special keys are designated by symbols intended to resemble the keys themselves. Since these symbols appear extensively throughout the instructions, we felt the following road map and glossary would help you, our reader, get any necessary bearings.

We have designed our software to use only those special keys common to the keyboards of the Apple II series. In most cases these special keys look the same on both keyboards, although their locations may differ. However, the CONTROL key looks different on the two keyboards, and we have therefore arbitrarily adopted the Apple IIe symbol, appearing below, to represent this key.

Left side of Apple IIe keyboard

Left side of Apple II, II+ keyboard

ESC THE ESCAPE KEY

The ESCAPE key is used most often for exactly what its name implies—to escape (exit) from various functions and processes.

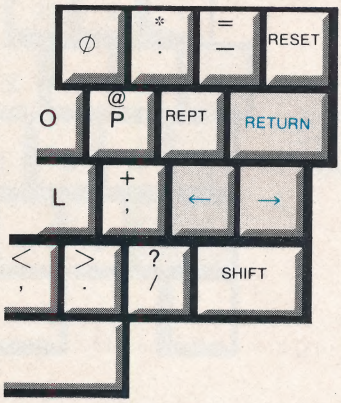
CONTROL THE CONTROL KEY

This key appears as CTRL on the Apple II/II+ keyboard, and as CONTROL on the IIe keyboard. We have adopted the symbol "CONTROL" to represent this key for both keyboards. The CONTROL key is always used in conjunction with another key by pressing it and the other key simultaneously. The purpose of the CONTROL key varies widely depending on the application program.

SHIFT THE SHIFT KEY

The SHIFT key, located on either side of the keyboard, is used with other keys to get special symbols and punctuation marks (for example, !, @, #, $, %, ^, and &).

Right side of Apple IIe keyboard



Right side of Apple II, II+ keyboard

RETURN **THE RETURN KEY**

This is the most frequently used key on the keyboard, because you must press it almost every time you need to give information to the computer. Since it is similar to the return key on a typewriter, you can think of it as the carriage return.

← **THE LEFT-ARROW KEY**

The Left-Arrow key is used to correct typing errors. Pressing the key once erases the preceding character so that a new character can be entered. It is also used at times for cursor positioning or game operation.

→ **THE RIGHT-ARROW KEY**

This key moves the cursor on the screen one character to the right. Any character it passes over is treated as if it were entered from the keyboard. It is commonly used to enter a line already displayed on the screen or as a game control.

TERMINOLOGY

In the preceding section we named and defined the special key symbols used in this manual. In our instructional narrative, it sometimes makes more sense to refer to a special key by its name rather than its symbol. Thus the key names of the preceding section are also special terms in this manual. Familiarize yourself with the names to simplify using the manual, and refer to the preceding section when necessary.

In the manual, our START-UP section commonly says that in order to run the program "you should be in Applesoft BASIC under DOS 3.3" This means that prior to running an *A+ Disk Magazine* program, you must boot your computer using either your *A+ Disk Magazine* diskette or another system diskette which will load DOS 3.3 into your computer. You should make sure that after booting you see the right bracket prompt, "]", indicating that you are in Applesoft BASIC.

TEXT CONVENTIONS

Most of the textual conventions of this manual are fairly obvious. Besides the special key symbols and names discussed above, command lines also deserve mention.

The lines appearing in bold print are commands, and should be typed in exactly as they appear. When two symbols appear next to each other in such a command line, they should be pressed simultaneously (i.e., type the second symbol while holding down the first symbol).

There is one other exception to typing in command lines exactly as they appear. When a command includes a phrase such as "somename" or "yourfile" or "programname", you should, when you enter the command, replace that name (but not any punctuation) with a valid filename of your choice. (A valid filename consists of 1 to 30 characters in length and must begin with a letter).

HARDWARE DIFFERENCES

Although all the programs in *A+ Disk Magazine* will run on the Apple II series computers, there are some differences among these machines. Most obviously, the Apple IIe supports both uppercase and lowercase letters, while the II and II+ support only uppercase. Additionally, there are certain keys available on the Apple IIe which are not available on the II and II+.

In order to ensure software compatibility and consistency across all three machines, we have elected to limit ourselves to the features available on the Apple II and II+. Therefore, our programs will use only uppercase letters and will use only the keys that are common to both the Apple II and II+ keyboard as well as the IIe. If any program in an issue should depart from this standard, the relevant differences will be stated explicitly in the accompanying article in the manual.

PROBLEM RECOVERY

There really is not a great deal to say about problem recovery with *A+ Disk Magazine*. If you use this software on the right equipment running the appropriate system software, as outlined above, you should experience no problems. Nevertheless, a few comments may resolve some of the more obvious difficulties.

Any Applesoft BASIC program can be interrupted at any time by pressing:

CONTROL RESET

If you do not see the Applesoft prompt "]" immediately, indicating that you are back in Applesoft BASIC, press these keys again. This is a rather drastic but effective way of regaining control of the computer. You won't damage any of the programs in this way, since they're still intact on the diskette. However, you will lose any data entered while the program was running.

ED 2013M

If you try to send something to the printer when there is no printer, or when the printer is off, you will hang the system. The computer will just sit there and will not respond to any keys pressed. If your printer is simply off, you can turn it on and printing will begin. Otherwise, you can try pressing:

CONTROL RESET

or re-boot your system.

Though we hope you will never need it, if you should find a "bug" in an *A+ Disk Magazine* program, the address to write to is:

A+ Disk Magazine
Problem Recovery
One Park Avenue
New York, NY 10016

In this issue we have provided a notes file on our editorial diskette, along with an accompanying read program, to address any problems in prior issues that have come to our attention. The purpose of this software column is to clarify any procedural confusion, as well as offer fixes to any "bugs" that are uncovered. To access this information, get into Applesoft BASIC under DOS 3.3, put your *A+ Disk Magazine* diskette in the default drive and type:

RUN NOTES RETURN

This information will then be displayed on your screen. Because of the long lead times required for *A+ Disk Magazine,* the information in our notes file may not always cover the issue just past. For more timely response, you should feel free to write or call us for help. Nevertheless, we felt a reference file of this kind would offer more complete support to our readers.

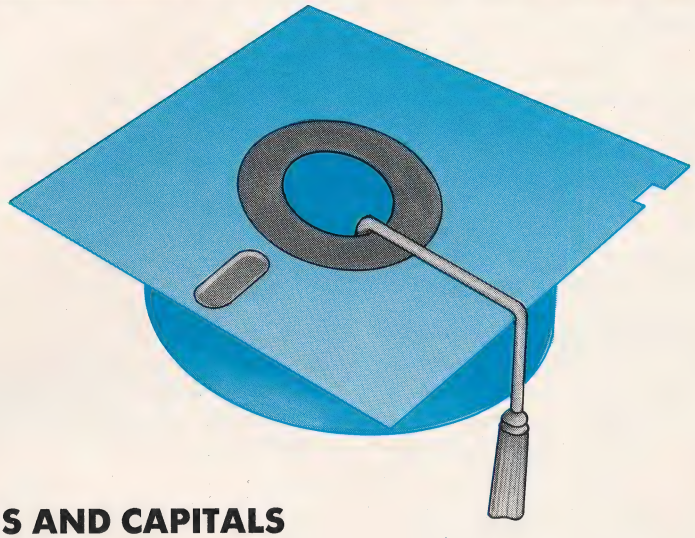
MERGING THE CODE

To move a block of code from one Applesoft BASIC program to another (for example, to merge two of your programs or to insert a separate subroutine into your program) you can use the RENUMBER program on the DOS 3.3 System Master diskette. The operating instructions for this program are also contained on the DOS 3.3 System Master diskette, under the program name RENUMBER INSTRUCTIONS. You may run this program for a detailed discussion of the features available. Our discussion here concerns only merging program code.

The general procedure to combine two blocks of code is as follows:

1. Start the RENUMBER program.
2. LOAD the program block to be merged into memory.
3. Tailor this block (i.e. use the DEL command to delete lines) and renumber it (with the &F command) as necessary.
4. Put this program block in RENUMBER's hold buffer with the &H command.
5. LOAD the program with which this block is to be merged into memory.
6. Merge the code in the hold buffer with the program code in memory using the &M command.
7. SAVE the resulting program.

There is one note of caution to observe here. If there are any duplicate line numbers in the two program sections to be merged, RENUMBER will leave the destination block intact and intermix the conflicting line numbers of the hold buffer block. The result can be a scrambled combination of the two program blocks. Therefore, before you put a program block into the hold buffer, be sure to delete all extraneous lines and renumber the block with the line numbers you know will not conflict with the destination block.



STATES AND CAPITALS

By Rex W. Franklin

Special Requirements: None
Files Used: STATECAP
FILLER

Adults are not always equipped to answer the diverse questions of the inquisitive child. Questions like "Why is the sky blue?", "Are zebras black with white stripes or white with black stripes?", and "What's the capital of North Dakota?" not only put parents on the spot, but can stymie otherwise intelligent people. Even if you do know the answer, you may not have time to explain things to your child's satisfaction.

While we cannot help you answer everything your child asks you, we can provide you with STATES AND CAPITALS, *an educational game that will at least coach your child on those puzzling geographical questions. Rather than asking you, your child can learn by doing, and self-teach states and capitals by running the program on your Apple. The game is equally enjoyable for adults, and we're willing to bet that you won't quit until you've mastered all the state locations and capital names. Never again will you have to say "I don't know" or "Go ask your mother/father" when asked for a capital city.*

STATES AND CAPITALS *is a guessing game that tests knowledge of United States geography as well as map-reading skills. The game's graphics outline the United States and the program awards you points for correctly identifying particular states and their capitals. The game allows students to learn at their own pace and includes a review feature to let them study problem areas. Now if you still want to know the capital of North Dakota, keep reading.*

START-UP

To begin *STATES AND CAPITALS*, you must be in Applesoft BASIC under DOS 3.3. Then put your work copy of the *A+ Disk Magazine* diskette in your default drive and type:

RUN STATECAP [RETURN]

The Title Screen will appear first, then the Main Menu. Here you can play by pressing:

1

To view the game instructions, press:

2

or quit and return to Applesoft BASIC by pressing:

3

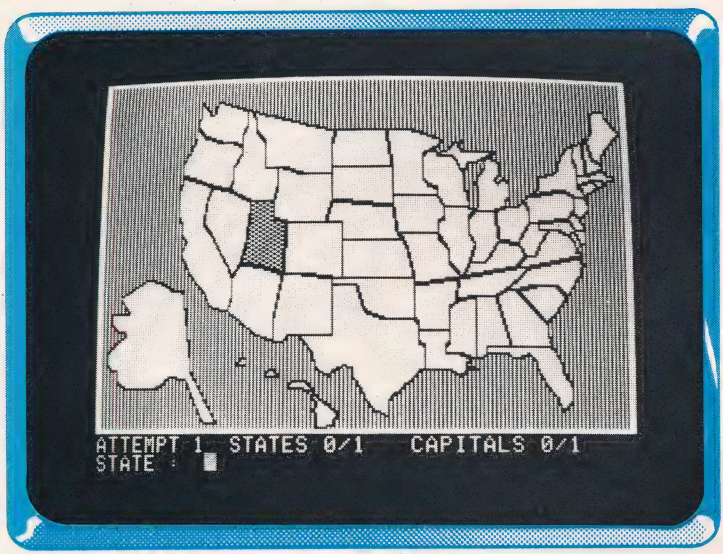
If this is your first time playing *STATES AND CAPITALS*, it will be best to read the instructions. Then press the RETURN key to continue.

PLAYING THE GAME

STATES AND CAPITALS is an easy game if you've done your homework. Before play can start, you must set the limit for this game. The following question appears on the screen: "How many states and capitals do you want me to ask you (1-50)?" Type the number you want and press:

[RETURN]

Since the program will be delayed for a few seconds, it will inform you, "I am thinking", and then instruct you to "Press RETURN to continue".



Can you guess which state this is?

Now it is time to guess your best! The program displays a map of the United States and outlines a particular state. You have two chances to correctly guess the name

of that state. If two incorrect guesses are made, the correct state name will be displayed on the screen.

You are then prompted to enter the capital of the outlined state. You have two chances to do so before the program gives the correct answer. The screen will display a total of the number of attempts and the number of correct answers given for the states and capitals.

Beware of misspelling the capital or state. The program checks, to some extent, for spelling mistakes. If you correctly guess an answer but spell it incorrectly, the program will prompt you to check your spelling, but you will not receive credit for a correct answer. If you realize that you have made a mistake and you have not yet pressed the RETURN key, you may correct your spelling. Use the Left-Arrow key to back up, then type in the correct name.

Pressing the ESCAPE key at any time returns you to the Main Menu where you can view the instructions, change the number of states, or exit the program.

REVIEW FEATURE

The game ends when the program has quizzed you on as many states as you specified. *STATES AND CAPITALS* tells you which states and capitals you answered correctly and draws them, one state at a time, on the map.

The progam then asks you if you "Want to see the states and capitals you need to study (Y/N)?". If you answer:

N

the program displays the number of states and capitals you were quizzed on, how many you identified correctly, and your percentage of correct answers. If you press:

Y

the screen shows the location of the first state on the map and prints its name and capital on the bottom of the screen. Take as much time as you like to review each state and capital, then press the RETURN key to page through the rest of the states.

When you are through reviewing these states, the program displays the game results as described above. Here you have the option to play again or quit. If you choose to play again, you will be asked how many states you would like to be quizzed on. If you wish to quit, the system will return to Applesoft BASIC under DOS 3.3.

DISK NOTES

In an effort to keep you as up-to-date as possible on our software, we have included a file entitled *NOTES* on your disk. Please take a moment to read it by typing:

RUN NOTES [RETURN]

SUBMISSION PROCEDURE

What sets *A+ Disk Magazine* apart from most other publications is that we want and need your direct involvement. Our appetite for quality software offers our readers a special opportunity to also be our authors. That's why we developed the "Software Submission Plan." If you're interested in submitting software that you've developed either on your own or with others, let us know, and we'll send you the Submission Plan booklet. This booklet provides details on our submission procedure, as well as our technical requirements for the software we publish. We would like to give you an outline of our Submission Plan here to stimulate your imagination and your interest.

The Software Submission Plan provides you with an opportunity to profit directly from your work. Under the plan, *A+ Disk Magazine* will pay you either a flat fee or a royalty on every issue sold containing your software. Best of all, this opportunity comes without elaborate restrictions. Our desire is to license software for publication only in a disk magazine format.

To explore the considerable opportunities for publication in *A+ Disk Magazine*, write to us and ask for a Software Submission Plan booklet. The address is:

A+ Disk Magazine
Author Submissions
One Park Avenue
New York, N.Y. 10016

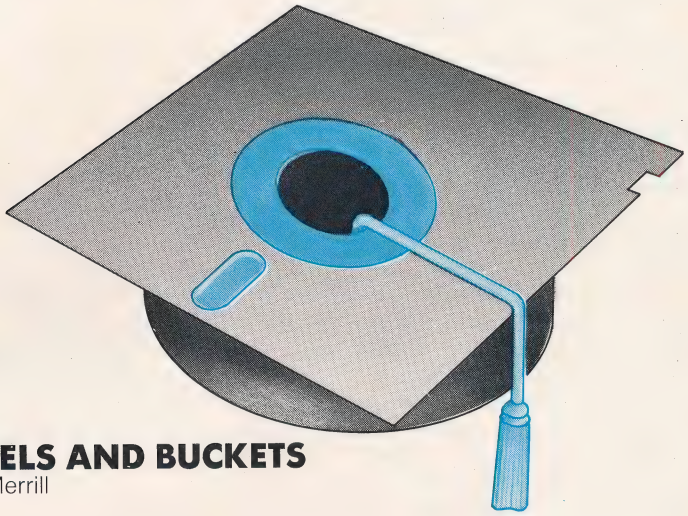
Once you've received the Submission Plan, read it over carefully. If you feel your software fits the requirements set out in the plan, complete the enclosed Software Submission Agreement and return it to us. Do not send us any documentation or program code when you return the Submission Agreement.

Following receipt of the Submission Agreement, the editors of *A+ Disk Magazine* will evaluate the submission. At that point, we'll either indicate a lack of interest in the software or, if we are interested, we'll issue a submission authorization number and ask you to provide us with an executable copy of the program along with documentation on 5¼" diskettes. Again, do not send us any additional materials until you receive a submission authorization number.

If we subsequently decide that we would like to publish the software in *A+ Disk Magazine*, we will offer a Software Contract, which will include such items as fees, royalties, advances, and program and documentation changes required (if any). You will be asked to complete and test any program modifications agreed to in the Software Contract, and *A+ Disk Magazine* will conduct a formal validation of the program and documentation.

We estimate that this process, from our initial evaluation to publication, takes approximately 3 to 6 months. This estimate is dependent upon a number of factors, and the process may take more or less time for your submission.

Our issues to date have already contained a number of programs received through our Software Submission Plan. The opportunity is real, so don't be shy. We look forward to hearing from you.



FUNNELS AND BUCKETS

By Stan Merrill

Programmed by Paul Ravina

Special Requirements: None

Files Used: FUNNELS
FUNNELS.SCR
HRCG
RBOOT
RLOAD
FUNNELS.M
FUNNELS.X
FUNNELS.G

Whether you realize it or not, you rely on your mastery of basic arithmetic every day. When counting change at the store, converting recipes for different numbers of people, or calculating the amount of fertilizer you need for your lawn, you depend on the knowledge you started acquiring in the first grade.

Since these skills must last a lifetime, we begin preparing our children at an early age to learn the basic mathematical concepts needed for everyday existence. Unfortunately, many children grow up bored or, worse, intimidated by the fundamentals of arithmetic. One way to prevent your child from getting "math phobia" is to make learning and practicing arithmetic enjoyable. Just run FUNNELS AND BUCKETS *on your Apple and see how much fun studying can be.*

BACKGROUND

FUNNELS AND BUCKETS is an entertaining game that incorporates the benefit of learning. The object of the game is to solve mathematical equations that fall from a

funnel moving across the top of the screen. The funnel is controlled by a sneaky burglar who would like nothing better than to fill his buckets with equations. To foil him and divert the equations, you must correctly answer the problems.

START-UP

Before problems can begin trickling down through the funnel, you must be in Applesoft BASIC under DOS 3.3. Next put your work copy of the *A+ Disk Magazine* diskette into the default drive and type:

```
RUN FUNNELS
```
RETURN

to make the Title Screen appear. Press the Space Bar to advance to the Options Menu.

THE OPTIONS MENU

You can make *FUNNELS AND BUCKETS* as easy or as difficult as you like. Before beginning the game, you can specify the type of arithmetic problems you would like to answer, the response time, and your choice of sound effects or silence. The game has already been set with some default game options which will appear in parentheses beside the selections on the menu. If you'd like to play using these default choices, just press the Space Bar and the game will begin. To change the options, first press the number of the category you'd like to change.

After entering the category number, you will see at the bottom of the screen a listing of the available options for that selection. The menu for problem type has five choices: (1) addition, (2) subtraction, (3) multiplication, (4) division, and (5) a mixture of problems. Since addition problems are the easiest, they are worth five points. Subtraction problems are worth ten, multiplication, 15, and division problems, since they are the hardest, are worth 20 points.

The list for sound effects has only two choices. Choosing:

```
1
```

will give you sound, while pressing:

```
2
```

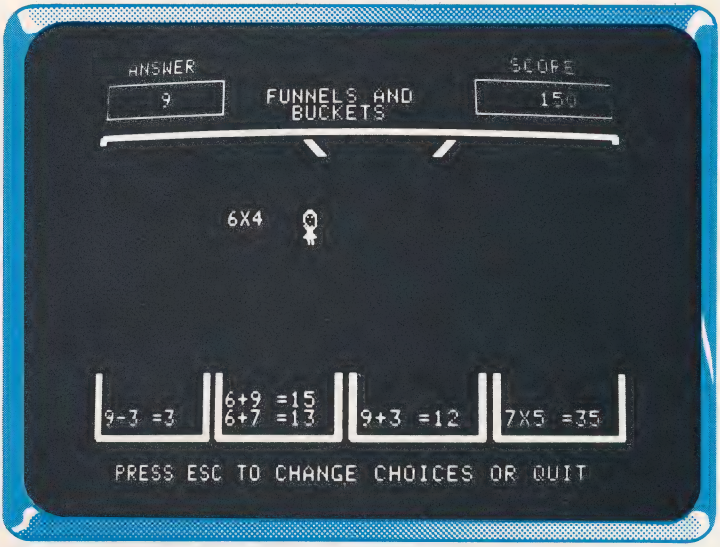
will allow you to play the game in silence.

Finally, set the rate at which the equations will drop from funnel to bucket. This option also controls how much time you have to solve each equation. There are six speeds, with "1" the fastest and "6" the slowest. To set the speed at which you'd like to begin, just press a number from 1 to 6. The game accelerates automatically as you improve and as your score increases.

PLAYING THE GAME

Now that you have set up the game, press the Space Bar to begin. The Game Screen displays a funnel and two boxes. The first box will show your answer, if you enter it correctly, or the right answer if you are in error. The second box will show your score.

FUNNELS AND BUCKETS requires quick thinking as well as mathematical skills. Equations fall through the funnel and move toward one of the four buckets at the bottom of the screen. You must "pop" the equation by typing in its solution. If you are correct, you earn points, but if you make a mistake, the equations land in the buckets. The program only accepts input from the numerical keys and the ESCAPE key, so you don't have to worry about accidentally pressing other keys. There's no need to press the RETURN key.



The FUNNELS AND BUCKETS challenge

FUNNELS AND BUCKETS is not just a race against time, but also against the Burglar. Try to answer before the equation drops into the Burglar's buckets, because once these buckets are full, the game is over. Periodically, the Burglar himself appears on the screen. If you solve an equation when he is present, he will steal all the points that you just earned. If he is on the screen and you answer incorrectly, he will steal double the number of points that the question was worth. Fortunately, you're not alone in the fight against crime, because another little character appears from time to time. Her name is Meggie and she'd like to help you. If you answer an equation while Meggie is on the screen, you get double the point score for that particular problem.

EXITING

The game ends when all of the Burglar's buckets are full of problems you could not answer. Alternatively, you can stop at any time by pressing the ESCAPE key. This brings you back to the Options Menu where you can either change the conditions of the game (problem type, speed, and sound effects) and then resume playing, or you can press ESCAPE once more to quit.

When the game is over, the program compares your score to the previous high score. If you have broken the old record, you will be prompted to enter your name. You will then see the question, "Care to play again (Y/N)?" Play again by pressing:

Y

or exit to Applesoft BASIC by answering:

N

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FUNCTION PLOT

By Hugh A. Calvin
Programmed by Paul Ravina

Special Requirements: None (printer optional)
Files Used: FNPLOT
FNPLOTM
FNPLOTX
HRCG
RLOAD
RBOOT

So you went out and bought an Apple. You thought you'd be able to create all sorts of fancy displays and graphics. Then you discovered that you couldn't do these tricks without buying expensive software. Well, cheer up. Here is a program that will do some pretty fancy plotting without ruining your budget. FUNCTION PLOT *does a lot of hard BASIC programming for you so that you can write a simple BASIC program to calculate mathematical functions.* FUNCTION PLOT *will then display the results in a graph.*

BACKGROUND

FUNCTION PLOT is written in BASIC. Part of this program allows you to add certain lines, which contain mathematical functions in the form of Y=F(X). Once you have done this, you can run the original program to calculate the results of your function over a specified range, and display the results in a graph labeled to your taste. You can make tables displaying specified values for up to four functions at the same time. Finally, you may save the specified functions on disk so that *FUNC-*

TION PLOT can call them up at a later session. Since this program uses only standard BASIC commands, it requires no special hardware or software.

START-UP

Before running *FUNCTION PLOT*, transfer the necessary files from the *A+ Disk Magazine* diskette onto a separate, formatted diskette that has room for the additional files that the program creates.

Be sure you are running under DOS 3.3 from the System Master diskette that was supplied with your computer. Type:

```
BRUN FID
```
RETURN

When the menu appears, select option 1 (Copy Files). A prompt asks you to enter the slot and drive numbers for the input and output disk. If you have only one disk drive, enter the same slot and drive number for both files. Once you designate the drive parameters, enter the first filename to be copied, FNPLOT. Now place your *A+ Disk Magazine* diskette in your default drive. If you have only one drive, press the RETURN key and the Apple will read your source file and then write to your blank diskette. If you have two disk drives, place your blank disk in drive number 2 and press:

RETURN

to execute the copy. Follow the same procedure for the other files to be copied.

To run the program, you must be in Applesoft BASIC under DOS 3.3. Put your work copy of the *A+ Disk Magazine* diskette in your default drive and type:

```
RUN FNPLOT
```
RETURN

After the Title Screen appears, you will be shown the Main Menu.

DEFINING YOUR FUNCTIONS

In order to define the functions you wish to plot, choose option 1 on the Main Menu. This choice brings up a submenu with three options. Option 1 is used initially to type in your functions manually. Option 2, as we shall see later, allows you to call up and reuse a set of functions from a previous *FUNCTION PLOT* session. The third option tells you that you can return to the Main Menu by pressing the ESCAPE key.

Option 1 on this submenu will bring you to the BASIC editing mode. You can now type in your function calculations. You should type in these functions as BASIC commands, starting on line 100 and finishing before line 950. The functions should have the form:

```
100 Y1=function(X)
```

where the "function" is any combination of standard BASIC mathematical functions and operations. You can type up to four different functions of X, naming them Y1, Y2, Y3, and Y4. Once you have done this, type RUN and press RETURN. Since you are in the BASIC editing mode, this key runs the current program, which means that *FUNCTION PLOT* is started up again. The lines that you have just entered are now incorporated into the *FUNCTION PLOT* program.

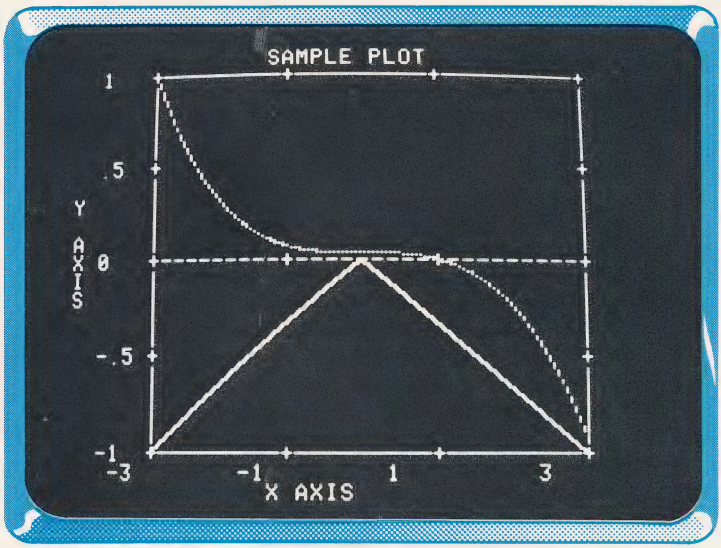
EVALUATING THE FUNCTIONS

In order to obtain the values of the function(s) for any value of X, choose option 5 from the Main Menu. You will be asked for a value of X, and the corresponding values for Y1 through Y4 will be displayed. To enter another value for X, simply press any key except ESCAPE.

To return to the Main Menu, press the ESCAPE key.

PLOTTING THE FUNCTIONS

After you return to the Main Menu, choose option 2 (Plot Function). First specify the labels and parameters for the entire plot, the Y-axis, and the X-axis. Next, set the range of values for X for which you are going to plot the values for Y. You will be asked for a start and a stop value for X. Once you have set all of these parameters, the program will take a moment to perform the calculations on the functions and then display your plot.



A plotted function

The functions are always plotted in the same size area of the screen, so the program will adjust the placement of the axes for readability. The scale on the Y-axis always goes from -1 to +1, but a minimum and maximum can be obtained for each function in order to ease numerical interpretation. Simply press any key (except ESCAPE, which returns you to the Main Menu) when the plotting is done. The bottom line will change each time you press a key, giving you the minimum and maximum values for each function in succession.

The values along the X-axis are scaled if they are greater than ten or less than negative ten. The scaling factor appears on the bottom line, to the right of the X-axis label. Six hundred would be printed as "6", and the scaling factor would appear as "*100", indicating that 6 is the number which is to be multiplied by the scaling factor of 100.

Let's try an example. To plot the function Y = 10X + 3, follow these steps:

1. Load the program and run it. The Main Menu will appear.
2. Select option 1. You will have a choice of how to define your function.
3. Select choice 1. The screen clears and an "Ok" appears.
4. Type in the function in BASIC:

```
100 Y1 = 10*X + 3
```
RETURN

5. Type:

```
RUN
```
RETURN

and the Main Menu reappears.

6. Select choice 2. Respond to each of the cues as follows:
Plot title:

LINEAR EQUATION RETURN

Y-axis label:

AMPLITUDE RETURN

X-axis label:

INDEPENDENT VARIABLE RETURN

X-axis start:

0 RETURN

X-axis stop:

12 RETURN

There will be a short delay while the function is calculated and then plotted on the screen.

CHANGING THE PLOT

Your original parameters reappear every time you plot a particular function. However, options 7 and 8 on the Main Menu allow you to change these parameters. Option 7 allows you to change the start and stop values for the X axis, and option 8 lets you change the plot title and the X and Y axes labels.

If you wish to change the functions themselves, press option 3 (Review Function). This will display lines 100 through 995 of the program and put you back into the BASIC editing mode. You may now use the BASIC editing commands to change or add to your function lines. (See your BASIC manual for details on BASIC program editing). When your editing is complete, run *FUNCTION PLOT* from the beginning again by typing:

RUN RETURN

SAVING FUNCTIONS

If you would like to save a set of functions for later use, choose option 6 on the Main Menu. You will be asked which drive contains the disk that will save the function. After you name the storage file, *FUNCTION PLOT* stores the function lines of the program, using the extension ".FN" as part of the filename.

The next time you run *FUNCTION PLOT*, you can access the saved functions by choosing option 1 on the Main Menu (Define Function) and option 2 (Read in Functions) on the submenu. Then designate the drive where the storage disk is located and type in the name of the storage file. (You need only type the name proper. The extension should not be used.) *FUNCTION PLOT* will read the lines into the program. To return to the Main Menu, type:

RUN RETURN

The plotting parameters must be redefined, since they are not stored with the functions.

TABULATING THE FUNCTIONS

Option 4 on the Main Menu allows you to print a table containing values of each function for a series of values for X. First you must fill in parameters for the values for X, then specify a start and stop value and a size for the steps between each

value. Then enter titles for lines 1 and 2 of the table. Line 1 contains the value chosen for X while line 2 contains the results of the function calculations. After the program displays the table, you can press the ESCAPE key to return to the Main Menu.

THE ADVANCED FEATURE

FUNCTION PLOT allows you to enter new coefficients in your functions each time you run the plotting program. Lines 10 through 95 of the program are reserved for this purpose. Enter the BASIC editing mode by using option 1 (Define Function) or option 3 (Review Function) on the Main Menu. Write a coefficient input program in the reserved space. When you define your functions in the function definition area of the program (lines 100 through 950), include these coefficients. Now, whenever you want your coefficient input program to run first, choose option 3 from the Main Menu to go to BASIC. Then type:

```
RUN  RETURN
```

Input the desired numbers, and they will be included in any operations performed on the functions.

For example, if you want to plot the function $y(x) = ax^2 + bx + c$, where "a", "b", and "c" are to be input as different values each time you plot the function, you would write a program similar to the one listed below:

```
10 INPUT "ENTER A"; A$
20 INPUT "ENTER B"; B$
30 INPUT "ENTER C"; C$
40 A = VAL(A$): B = VAL(B$): C = VAL(C$)
```

Each time you run the program, you will be prompted to enter new values for the coefficients a, b, and c in your function.

There is a chance that the *FUNCTION PLOT* program will crash if you use the advanced feature. This will happen if you have chosen a variable name for your redefinable coefficients that is also used by the *FUNCTION PLOT* program itself. You can avoid this by choosing variable names that begin or end with the letter "U".

If you ever wish to change the coefficient-input program while running *FUNCTION PLOT*, choose option 3 (Review Function) on the Main Menu. This option lists only lines 100-950 of the program. But since you are in the BASIC editing mode, you can view the inputting program by using the BASIC command:

```
LIST 100, 950
```

to see these lines and modify them.

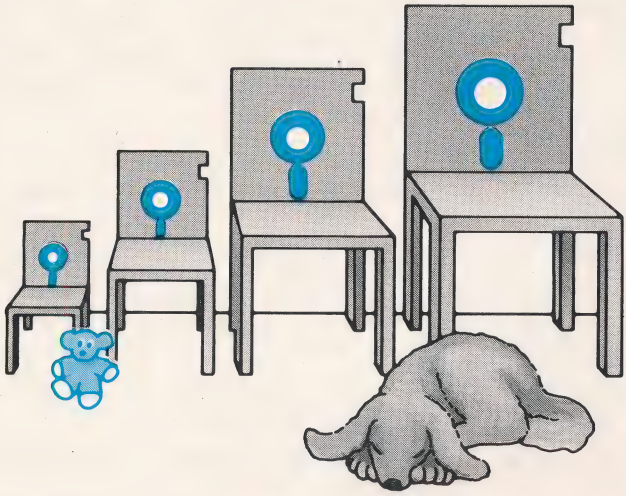
If you are using the advanced feature and choose the Save Function On Diskette option, the advanced feature section of your program will also be saved on disk, and will run whenever you reload the functions from the storage disk.

EXITING

You can exit *FUNCTION PLOT* by pressing:

```
X
```

from the program's Main Menu. Caution: This option will not save any information from the *FUNCTION PLOT* session automatically. You must save functions during program execution.



HI-RES SAILBOAT

By Peter Schug

Special Requirements: Paddles are optional
Files Used: SAILBOAT

If sailing is your sport or you would like it to be, but a boat isn't handy right now, this program will allow you to experiment with a realistic computer model of a sailboat. For beginners it is a rare opportunity to get your feet wet without wringing out your sneakers. It is also an excellent tool for an instructor who wants to teach sailing and still devote his undivided attention to his students.

BACKGROUND

Common sense tells you that if you're standing on a raft holding up a large cloth, the wind will push the cloth and the boat along with it. This is precisely what happens on a sailboat when you want to sail in the same direction that the wind is blowing. You simply point the boat in that direction and position the sail so that it catches the greatest amount of wind. To do this, you let the sail swing away from the boat until, ideally, it is perpendicular to the boat and the wind. Sailors call this sailing "downwind" or "running" with the wind, and it is the easiest type of sailing to understand. But if boats could run only downwind, the New World might never have been discovered.

While it is not possible to make a boat go directly into the wind, sailboats travel "upwind" to within about 45 degrees of the direction from which the wind is blowing. This is done not by using the sail to catch the wind, but by using the sail as an airfoil. As it moves over the rounded sail, the wind creates a force that pulls the boat forward, in the same way that the wind flowing over a curved airplane wing pulls the plane up into the sky.

However, several factors make this concept difficult to understand. First, the "lifting" force pulls the boat not only straight forward in the desired direction, but also slightly off to the side. Consequently, sailboats are designed with keels and centerboards to help them resist sideways motion and maximize this "lifting" force. Still, boats slip sideways a little, so that the direction they actually travel is usually a few degrees on the downwind side of the direction in which they are pointed.

A second confusing factor is that when a boat begins to move, the breeze that the movement itself creates combines with the actual wind to create a new breeze that feels like it is coming from a different direction. An experienced sailor can tell where the real wind is, but the sails react only to this combination wind, called the "apparent" wind.

PROGRAM STRUCTURE

The *SAILBOAT* program diagrams these interacting forces and demonstrates how they provide locomotion. Although one can probably understand them to some degree on an intuitive level, one needs a deeper understanding in order to achieve peak performance, for example in racing. This program uses a mathematical model to describe (in pictures) the effect of these forces on the sail and the boat. The program allows you either to sail a boat or to generate vector diagrams while the boat is under sail. At the bottom of the screen, a legend describes factors such as the strength of the apparent wind and the boat's speed in knots. The vector diagrams and legend describe fairly completely the results of trimming the sail and/or changing the heading. In stable conditions, the performance simulates that of a real boat.

START-UP

To run *HI-RES SAILBOAT*, make sure your machine is in Applesoft BASIC running under DOS 3.3. Then put your *A+ Disk Magazine* diskette in the default drive and type:

```
RUN SAILBOAT RETURN
```

You are then instructed to press the RETURN key for further instructions.

A second screen details the keys that are used in both the paddle and keyboard modes, which you will use to control the sail and rudder. There are certain differences between the two modes. If you are using the keyboard to sail the boat, you will not have very precise control of the sail setting. However, you can still see what happens between the incremental sail settings by steering the boat for one or two frames. The major advantage of the keyboard is the "H" control, which is like an auto-pilot.

In paddle mode, the sail and the rudder can be set for very fine increments, but the advantage is not obvious, because there will be a time delay between your commands and any visible changes on the screen. Often the boat's response lags behind your command by one whole frame (each separate drawing of the boat is a "frame" and they occur four to five seconds apart.) Be careful not to

over-control the boat—allow enough time for the screen to readjust before entering more commands.

The keys relevant to the two modes are the following:

P—sets *HI-RES SAILBOAT* to the paddle mode where:
Paddle (0)—controls the rudder.
Paddle (1)—controls the sail.
Clockwise—sheeted in.

K—sets *HI-RES SAILBOAT* to the keyboard mode where:
←—rudder left (15 degrees per press).
→—rudder right (15 degrees per press).
1-9—trim the sail. (1 is sheeted in and 9 is sheeted out).
H—holds the course.

Common to both modes are the following keys:
M—sets moving boat mode.
V—sets vector diagram mode.
F—freezes the frame for examination.
Q—allows you to quit.

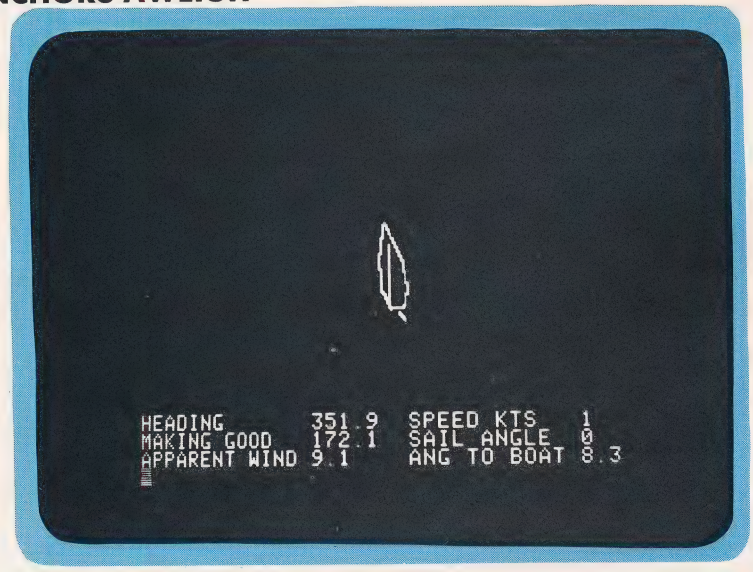
You can now set the program to the paddle mode by pressing:

P RETURN

or the keyboard mode by pressing:

K RETURN

ANCHORS AWEIGH



Hoist the mainsail! Full speed ahead!

After you choose either "P" or "K", the screen will go into high-resolution mode and display a picture of the boat in the center of the screen facing north (up). At the bottom of the screen is a legend describing various performance parameters. At this point, you are in the moving boat mode. The boat is not yet mobile, however, and therefore not controllable. Since it is facing straight ahead into a ten-knot

wind, it will begin drifting backwards. Allow the sail full freedom, and put the rudder hard over. (Sail freedom is fully counter-clockwise in the paddle mode. Keyboard mode comes up with the sail free.) When the boat has turned about 45 degrees, straighten the rudder and sheet the sail in. The boat should start moving forward.

At this point it might be handy to understand the titles in the screen legend. They are:

1. Heading—the direction the boat is pointed.
2. Speed knots—how fast the boat is going in knots.
3. Making good—the direction the boat is actually moving. Sailboats go a little sideways due to the force of the wind. The sideways motion is called leeway. The course made good includes leeway, and is therefore not the same as the heading.
4. Sail angle—the angle at which the wind hits the sail. Positive numbers indicate starboard tack (meaning the wind is coming across the right side of the boat) and negative indicates port (wind coming over the left side of the boat). The range is 0 to 180 degrees. Sail angle does not signify the sail freedom or the angle of the sail to the boat.
5. Apparent wind—the strength of the wind as it is felt on the boat. The vector sum of the boat's forward motion and the wind's speed equals the actual strength and direction of the wind. This is not the same as the wind itself.
6. Angle to boat—the angle of the apparent wind to the centerline of the boat. Once again, positive numbers indicate starboard, and negative for port, with a range of 0 to 180 degrees.

Judging from the screen image and the numbers displayed in the legend, you can get a fairly good idea of how a boat sails.

VECTOR DIAGRAM MODE

You can gain a more detailed understanding if you enter the vector diagram mode. Each vector represents a quantity (force or velocity) that has both magnitude and direction. In this mode, there are two boat images on the screen. The one on the left shows the real wind, which is the vertical line going to the center of the boat. Its length represents the ten-knot speed of the real wind and it is aligned due north. The line farthest from the real wind in the left diagram represents the boat's motion. Notice that it is seldom aligned exactly with the direction in which the boat is pointing. This is an effect of leeway (the slight sideward motion of a sailboat in the downwind or leeward direction). The line between the two is the apparent wind (as described above).

On the right side is a diagram showing the lift and drag vectors and their resultant force. Lift is the force felt by the boat at a 90 degree angle to the wind. Drag is a force in line with the wind. The line closest to the front of the boat is the lift force vector, and the line farthest away from it is the drag force vector. The line between them is the total force vector, which is what actually propels the boat. Not shown in the diagram is the lift and drag characteristic of the hull and how it resolves the force of the wind into forward motion. The program assumes a 20 to 1 ratio of lift to drag, which means that the boat is 20 times harder to move sideways than to move fore and aft. Having the program do the actual calculations would probably double the length of time required to draw a frame.

The program can switch between the vector mode and the moving boat mode as often as you like. If you are in the moving boat mode and the boat is performing strangely, try pressing:

V

to see if the vector diagrams explain why. Pressing:

M

returns you to the movement mode. During fast turns, the vector diagrams may get a bit out of skew since all of the forces are interdependent, but as soon as a stable condition is reestablished, all of the vectors look as they should.

The Freeze feature works in either mode and lets you halt the program and examine a diagram.

SAILING THE BOAT

A sail is an airfoil in the respect that it interacts with moving air. The classic measurement of an airfoil takes into account its lift and drag characteristics. When moving toward the wind (windward), the best performance is achieved with the sail angle that provides the best ratio of lift to drag. This is generally at about 15 degrees to the apparent wind. The sail generates its greatest lift at 17 degrees. When reaching (going across the wind), shoot for this setting. Drag doesn't hurt performance as much here as when you are going into the wind. When going down-wind, it is no longer possible to use lift. Optimum performance is achieved by maximizing drag, an admittedly less efficient method for an airfoil. That is one of the reasons that you see spinnackers used downwind—they are designed to maximize drag. One of the peculiarities of sailing downwind is that the faster you go, the less wind there is. If you went as fast as the wind, your sails would hang limp and nothing would be left to drive the boat. Thus, even spinnackers succumb to the law of diminishing returns.

In most cases it isn't worth trying to sail (maintain a heading) closer to the wind than 45 degrees. Keep the sail (the sail angle) as tight as you can, and as close to 17 degrees as possible as your heading gets farther from the wind. When the sail is sheeted all the way out and you still can't get a sail angle smaller than 25 degrees or so, it is time to sheet in and get the sail angle up to around 90 or 100 degrees. At this point you should be trying to propel the boat using drag instead of lift. The bottom line is the total force vector. The size of this vector determines how hard the boat is being pushed, while the direction in which this vector points is where the boat is being driven, modified by the lateral resistance of the keel (the program's 20 to 1 ratio). Thus there is a point at which the diminishing effect of lift and the increasing effect of drag require a change in strategy.

EXITING

To exit the program, press:

Q

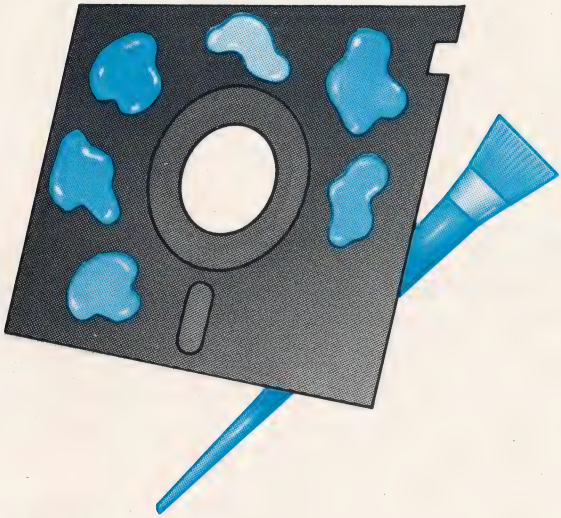
You will be asked if you want to quit. If you answer:

Y

to the next prompt, the system will return to Applesoft BASIC.

2D 2013M

UTILITIES



BASIC COMPARATOR

By Bill Grimm

Special Requirements: None
Files Used: BASIC COMPARATOR
FILE COMPARE

You've just copied your favorite program onto a new disk so your friend down the street can use it on his new Apple. Suddenly the phone rings. "What's this plastic pancake that you've given me?" your irate neighbor exclaims. "I put it into my computer and all I get is a string of error messages, stars, asterisks, and unprintables."

Ashamedly, you invite him to bring the disk over so you can compare his copy to yours. You load BASIC COMPARATOR *from your new issue of* A+ Disk Magazine, *and within seconds, your Apple is cross-checking the program files. With your dour neighbor breathing down your neck, you display the results of the test.*

Line 1125 in the program has been deleted from your friend's copy and there's an entirely irrelevant line 1362 in his copy that causes the program to spew forth nonsense—he has been fiddling with your program! You sternly advise your neighbor to subscribe to A+ Disk Magazine. *A changed man, he skulks out the front door, pausing only long enough to offer you unlimited use of his swimming pool this summer.*

BACKGROUND

While perhaps not capable of the neighborhood miracles described above, *BASIC COMPARATOR* is nevertheless a handy program. It is a utility designed to compare files which are either on the same disk or on different ones, and tell you whether they correspond in content. If the two BASIC program files have discrepancies, *BASIC COMPARATOR* gives you a line-by-line list of the differences.

START-UP

To run *BASIC COMPARATOR*, you must be in Applesoft BASIC under DOS 3.3. Then put your *A+ Disk Magazine* diskette in your default drive and type:

RUN BASIC COMPARATOR [RETURN]

to call up the title page. After this, the second screen warns you that if you have only one disk drive, the two files to be compared must be on the same disk. At this point the *BASIC COMPARATOR* program is fully loaded; remove the *A+ Disk Magazine* diskette from the drive and insert the diskette containing your files. If you have two drives, you will be able to compare a file on one drive with a file on the other.

RUNNING THE PROGRAM

To begin entering file information, press the RETURN key. The first of the two files you are comparing is called the Reference File and the second, the Comparison File. First enter the name of the Reference File, the slot that your disk drives are connected to, and the number of the drive containing the Reference File. The slot and drive numbers for the Reference File are set, respectively, to 6 and 1. Next enter the same information for the Comparison File. The default values for slot and drive for this file are 6 and 2. If you have only one disk drive, you must set the slot and drive values for both files to the same settings. The program will sense this and know that it only has one drive to work with.

If you notice any mistakes when you have finished entering this preliminary information, you will have the option to press "R" for Redo. Simply reenter the information. If you press:

[ESC]

the Options Screen will appear. This allows you to list your results on the screen or the printer, compare additional files, perform a catalog (of the disk contained in the last drive accessed) or exit to BASIC. However, since you have yet to perform a comparison, you cannot display results at this time.

Pressing the RETURN key will offer you the option of comparing an entire file or just a part of it. This is only appropriate if you are comparing BASIC program files. If you choose to compare only part of a file, you will be prompted for the range of line numbers within which to make the comparison.

Next you must place the disks in the appropriate drive, if you have not already done so, and press:

[RETURN]

to continue.

WARNING

Before the actual comparison occurs, the screen tells you that "Disks may not be removed until comparison is done". This is very important. You are liable to destroy the contents of the disks if you try to remove them from the drives while the comparison is taking place.

INTERPRETING THE RESULTS

The results of the comparison can take two different forms, depending on the nature of the files you are comparing.

If you are comparing a BASIC program or text files, the program will display the Options Screen. This screen enables you to list the results of your comparison on the printer or the screen, compare more files, view a catalog, or exit the program and return to BASIC.

The results take the same format whether output to the screen or the printer. The filenames are listed at the top of the screen or form. These are followed by a line-by-line list of the differences between the two programs. This list looks rather like a program listing itself. Needless to say, if the programs are the same, this list will be exceedingly short. If there are differences, the lines that are in the Comparison File but not in the Reference File will be preceded by a remark statement that tells you that they have been "Added". If there are lines that are in the Reference File but not in the Comparison File, they will be preceded by a line that says "Remark deleted". The lines will appear in order by line number, and the remark statements will have a line number of zero. Finally, if there are lines in the Comparison File that differ slightly from the corresponding lines in the Reference File, they will be preceded by a line that says "Remark changed".

This line-by-line list is especially useful. You can compare different editions of the same program or, if you are having trouble with a particular subroutine or module, compare sections within the programs. *BASIC COMPARATOR* also estimates when lines are functionally the same, even though they may differ slightly in format. For instance, two lines that are identical except for the spacing between commands will not be listed as different.

After you have viewed or printed the results of your comparison, you will be returned to the Options Screen. Other available options on this screen are to view a catalog of the disk contained in the last drive accessed, to compare more files, or to exit the program and return to BASIC.

If you are comparing binary files, the program will count the number of sectors in each file and display an asterisk for each sector. When the full number of sectors for the Reference File has been read, the program displays an "R". When the full number of Comparison File sectors has been read, the program displays a "C". So if your files match, the "R" and "C" will be in the same spot. If the files are not identical, the screen will display the message "Files do not match".

EXITING THE PROGRAM

The *BASIC COMPARATOR* lets you escape from the program at almost any stage. If you press:

ESC

the Options Menu will allow you to exit the program and return to Applesoft BASIC.

CALLING ALL PROGRAMMERS!!

If you have written software for the Apple II, II+, or IIe that you feel would be of use or interest to others, *A+ Disk Magazine* would like to know about it. Publishing is no longer just for poets and prosaists, but now it's for programmers too. Ask for our Software Submission Plan by writing to:

A+ Disk Magazine
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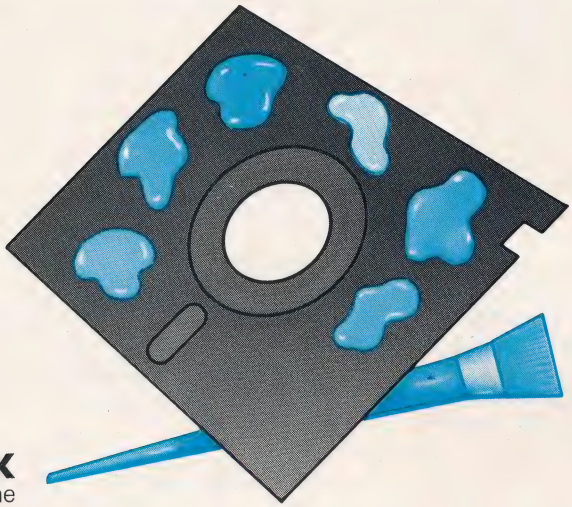
One Park Avenue
New York, N.Y. 10016

UTILITIES



AMPER UTILITY PAK

By Nibble Magazine

Special Requirements: None
Files Used: AMPER PAK
AMP-L-SOFT
AMPER FREE SPACE
AMPER READER

Have you ever felt that some of the more elegant functions of the Apple computer were just too hard to access or too hard to use? If you have been programming for awhile, you might know the machine well enough to call or poke a memory location, but even that can be a bother. The Apple computer provides a small concession toward solving this problem. Whenever an ampersand is entered into the computer as a command, the computer stops and searches a memory location for further commands. The Amper utilities are several small machine language programs that are stored in that memory location and can be activated by the ampersand.

This issue of A+ Disk Magazine *provides five small programs, called Amper utilities, that the user can access either directly from DOS or within an Applesoft program. The programs consist of a tone generator, a string input that accepts all characters including commas and colons, a text reader that allows you to read quickly from a text file, a substring locator that finds any smaller string within a large string, and a small routine that catalogs your disk and determines how many sectors are free. Each of these machine language programs is easily accessed by typing an ampersand and the program's name.*

PROGRAM STRUCTURE

The Apple computer is designed to recognize the ampersand character within a BASIC program or from DOS. When the Amper utilities are originally loaded into your machine, they set up a command table containing the names of your Amper utilities and their locations in memory. Typing the ampersand makes the computer immediately stop execution of any program and look at memory location $3F5 for further instructions. This memory location contains a jump command that sends the computer to the command table. It is from this point that the computer finds the proper memory location and executes the correct amper program. Once the amper program is completed, the computer returns to your own BASIC program, restarting execution at the line after the ampersand.

START-UP

To load the Amper utilities into your computer, you must first be under DOS 3.3. Insert your *A+ Disk Magazine* diskette into your default drive and type:

RUN AMPER PAK RETURN

This program loads into memory the five amper programs and the command table. When loading is completed, a blank screen appears with the DOS prompt; Applesoft does not know that your Amper utilities exist in the machine and will function as if they didn't. To use these programs, simply enter the ampersand, the command letter, and any necessary parameters.

AMPER TONE

This program produces tones of specified frequencies and durations. It can be entered into any BASIC program or DOS by using the command "&N(P,D)". The first variable determines the frequency or pitch, while the second sets the duration. Both variables must be between 1 and 255. One is the highest pitch, 255 the lowest. One also represents the shortest duration, while 255 is the longest.

An example of a short three line BASIC program to produce a high tone of medium duration would be:

```
10 P=47 : D=130
20 & N(P,D)
30 END
```

or the same tone could be produced at the DOS prompt by typing:

&N(47,130) RETURN

The note corresponding to pitch 47 is approximately a C. With a little trial and error, you can locate the pitch values that correspond to the notes of a chromatic scale. The program includes several octaves, but the space between successive pitches usually does not represent a standard half or whole step. Therefore, a sample chromatic scale can be produced with a somewhat arbitrary sequence of numbers rather than a consecutive sequence. One complete chromatic scale (that is, a 12-note scale including all sharps and flats) results from the pitches 47, 44, 42, 40, 38, 35, 33, 31, 29, 28, 26, 25, and 23. Note that these pitches become higher as their numerical values decrease. The series includes 13 numbers because both 47 and 23 represent a C, thereby completing the octave. Although your computer may vary slightly, you should be able to produce similar results, and once you know the notes' pitch values, you can compose whatever you like.

AMPER FREE SPACE

The Amper Free Space utility catalogs the disk in your default drive and indicates how many sectors are still free. The syntax for the free space command is "& F(". This command is equally valid in DOS and Applesoft.

AMPER READER

Amper Reader is a program designed to allow you to input from a text file in as little time as possible. Normally when you read a text file from disk, your computer must find memory space to hold the string you are entering and then must locate the next sector on the disk it should read from. These processes often take long enough that your disk drive motor is turned off between reads. The Amper Reader will clean up memory and locate the next sector fast enough to allow a continual read from your disk.

Amper Reader can be used directly from DOS or accessed from within a BASIC program. Its format is fairly simple:

```
&R(FI$,ST$(I),NR%,ER%)
```

where "&R" calls up the Amper Reader program, and "FI$" represents any valid filename. An array variable can also be inserted for FI$. "ST$(I)" is the string that is being picked up from your text file. The number "I" will increase to I+1, I+2, and so on until it reaches the value of "NR%", which represents the number of records you wish to read in from your file. If NR% is set to zero, then all the records in the file will be read in. Finally, "ER%" is a special Amper Reader error code that returns operation to your program. The error codes are as follows:

0 normal return
1 out of memory
2 file not found
3 disk read error
4 not used
5 end of file

Remember that you must dimension "ST(I)" earlier in your program to equal or exceed the number of records you are retrieving. What follows is an example of the Amper Reader used in a short BASIC program.

```
10 DIM A$(100) REM—FEWER THAN 100 RECORDS EXPECTED
20 FI$=EXAMPLE REM—FILENAME IS SET TO EQUAL "EXAMPLE"
30 NR%=0:ER%=0 REM—INITIALIZE BOTH ER% AND NR%
                TO ZERO
40 &R(FI$,A$(1),NR%,ER%) REM—AMPER READER STARTING
                         RECORD ONE
50 IF ER%<>0 AND ER%<>5 THEN STOP REM—ERROR CHECK
60 FOR I = 1 TO NR%
70 PRINT A$(I) REM—PRINT OUT ALL STRINGS
80 NEXT I
```

If you had initialized "NR%" to equal five instead of zero, it would have read in only the first five records.

In case you want to read in fewer than the total number of records and then return to read in the rest, Amper Reader provides a Continue function. It has the same format as Amper Reader but instead of calling up the program with an "R", you use a "C". The format would be:

```
&C(FI$,ST$(I),NR%,ER%)
```

This statement will continue where the last "&R" or "&C" statement left off. An additional feature, the "&D" statement, deallocates and lets you redimension the "A$" string during your program. For example, insert the following code in the program above to eliminate the A$ string, reset the string boundary pointers, and redimension it:

```
62 &D(A$(0)): REM-MUST SPECIFY ZERO ELEMENT!
64 X=FRE (0)
66 DIM A$ (100)
```

AMPER INPUT

Amper Input allows you to input strings which contain commas or colons. Normally Applesoft interprets commas and colons as delimiters ending an input field. When you try to input a string with either of these characters, you get the message "Extra Ignored", because the input statement only brings in that part of the string that precedes the delimiter.

Amper Input allows the input statement to bring in the whole string up to the carriage return. The Amper Input can be used when reading from the keyboard or from a disk. The format for the input statement is:

```
&I(IN$)
```

where "&I" calls up the Amper utility and "IN$" holds the string you wish to input. A short BASIC program to input ten strings from the keyboard and store them in an array would look like this:

```
10 FOR X= 1 TO 10 REM—LOOP TEN TIMES
20 &I(IN$) REM—INPUT STRING
30 ST$(X) = IN$ REM—STORES INPUT IN ST$(X) ARRAY
40 NEXT X
```

This program will input from the keyboard or from a text file, if you have one.

AMPER SUBSTRING

This is a function that searches one string and tells you where a particular substring is located. You can use it to edit input strings from disk and keyboard, to look up code numbers, and to format output strings. It doesn't do anything that the MID$ function in a loop can't do, but it does make the job faster and easier.

The format for the substring locator is:

```
&B(OB$,TA$,I%)
```

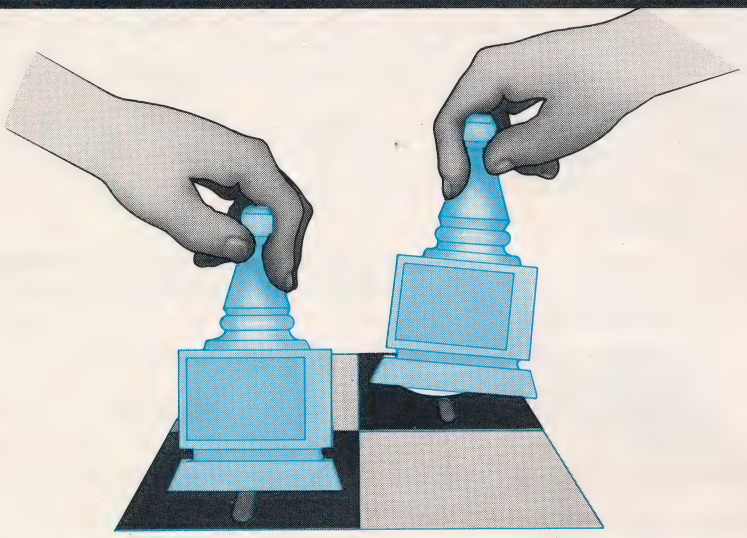
where "&B" calls the substring function, "OB$" represents the full string, "TA$" is the substring you want to locate, and "I%" returns the location of the substring. When you start your search, I% must be set at the place you want to begin, usually position one. If your substring is found, I% shows the position; if not, then I% returns a zero. A simple BASIC program is as follows:

```
10 I%=1 REM—START SEARCH AT POSITION ONE
20 A$= "SEARCH THIS STRING"
30 B$= "T"
40 &B(A$,B$,I%) REM—CALL SUBSTRING UTILITY
50 PRINT I% REM—PRINT LOCATION
```

In this program, "I%" would print out as 8. If you wanted to locate the rest of the "T" in the string, you could make I% equal to 9 and continue the search.

EXITING

Since the Amper utilities are loaded into a memory location not normally used by Applesoft, you can just leave them loaded in your computer when you are not using them. However, if you feel that they might interfere with the operation of a program, you will have to reboot your system in order to clear them out of memory.



SECRET AGENT 2

By Jor-And

Special Requirements: None
Files Used: SECRET AGENT: MISSION ONE
B3, BA, M, M2, OB, ID, N
SAVE, ALL P FILES

TOP SECRET

To: Agent 003—Batangali
From: Headquarters—Worldwide Intelligence Service
Re: Dr. Melton's attempt at world dominance through the threat of total annihilation
Note: To be delivered by armed diplomatic courier

According to sources at the Worldwide Intelligence Service, the first part of this mission has been completed. We are counting on you to continue this mission and bring it to a timely and successful conclusion. We have enclosed a copy of the original brief so that you will have all the pertinent information.

ORIGINAL BRIEF

The world is being held hostage by an evil scientist who has invented a weapon so powerful that it makes nuclear war look like a turkey shoot. Time is running out.

Each passing hour brings the world closer to either unconditional surrender or total annihilation.

After having heard rumors of Dr. Melton's activities several weeks ago, we sent agent 411 to investigate. Unfortunately, he has not been heard from since. The following is all the information we have on Dr. Rupert Melton.

FILE: MELTON, RUPERT H.

1951—Graduated X.Y.U. with a Ph.D. in physics.

1952-1980—Worked in a Washington-based think tank on weapons design.

1980—Presented idea for the Energy Synchronizer (E.S.), a weapon which concentrates high amounts of energy at certain coordinates to create explosions.

1980—Resigned position after several disagreements with government officials.

1981—Moved to one of the islands off the coast of a little-known area called Batangali.

Yesterday the General Assembly of the United Nations received the following letter from Dr. Melton.

Gentlemen,

It has occurred to me that a man of my greatness needs a kingdom equally great. Therefore, I have come to the inevitable conclusion that I must rule the world.

As you know, my creation, the Energy Synchronizer, is the most powerful weapon known to man. Since I alone have it, there is no way you can stop me . . . .

I am kindly giving you 48 hours to recognize me as your new leader, or I will begin destroying cities throughout the world until you surrender. I hope this will not be necessary, but I assure you that I mean what I say.

Sincerely,
Dr. Rupert Melton

Our original idea was to bomb Melton's island, but we have recently learned that he has an automatic firing device which, if the island is attacked, will trigger the E.S.

Your mission is to find Dr. Melton's secret island and deactivate the automatic firing device of the E.S. long enough to allow us to bomb the island. We will provide you with a special radio watch. Once you have deactivated the weapon, turn the dial to notify our forces that you have completed your mission. After we receive your transmission, you will have a limited time to get to the shore of the island where one of our helicopters will be waiting to pick you up. As soon as you are safely aboard, we will blow the island off the face of the earth.

We have made reservations for you at the Batangali Hillton under the name of Jose Caldera. You will be expected to check in at the hotel immediately. Despite the alias, proceed with extreme caution and trust no one. Keep in mind that if Melton discovers your whereabouts, he will stop at nothing to kill you.

You can maintain contact with us through a special hotline obtained specifically for this mission. The number is 247-6658. Call us whenever possible to receive updates on the status of your mission.

Good luck. The fate of the world is in your hands.

***** THIS DOCUMENT WILL SELF-DESTRUCT IN 5 SECONDS *****

GAME STRUCTURE

This game will be presented in four installments of *A+ Disk Magazine* in order to increase the suspense. Installments 1, 2, and 3 can all be played independently, but part 4 requires that you have played and successfully completed your mission

in parts 1, 2, and 3. At the end of the first two installments, your rank as an agent will increase and you will receive a special password. These passwords and information you will receive in the third installment are required for completing installment 4. Throughout the adventure, you will also acquire certain objects that you will need in order to complete each installment.

The game incorporates a special Save and Restore option, which you can use if you copy *SECRET AGENT* to a working diskette. At any time during the game, you may save the adventure up to that point and continue playing. If you are killed later in the game, or you would like to return to the save point to pick up a missed object, you can restore the game at the point at which you saved it. The save point is stored on your disk and can be recalled at any time. You can also use this feature to stop the game and resume later without having to start at the beginning. The Save and Restore option can only be used for one game at a time.

GAME COMMANDS

The following is a list of standard commands that can be used throughout the game:

N,S,E,W - North, South, East, and West help you to move around outdoors.
GO (+ a noun) - moves you to a particular noun. Examples of this are "Go door" or "Go window".
U or **D** - move you up or down.
GET (+ a noun) - lets you pick up objects.
DROP (+ a noun)- allows you to put down any object in your possession.
LOOK - displays a list of all visible objects in the room that you can Get, and gives a general description of the room. When Look is used with a noun, it will often give a description of a particular object.
I or **INVENTORY** - lists all the objects currently in your possession.
SAVE GAME - saves the game at that point.
RESTORE GAME - allows you to continue playing a "saved" game.
RETURN - lets you review your last few moves.

You need enter only the first four letters of each command word. The program understands abbreviations such as "Unlo Wind" for "Unlock Window".

There are several other commands that are used only in certain situations. Some of these commands are fairly obvious, while others may take some time to figure out. You will not be penalized for entering wrong commands, but they do waste valuable time.

START-UP

Before running the game, transfer the necessary files from the *A+ Disk Magazine* diskette onto a separate, formatted diskette that has room for the additional files that the program will create if you use the Save and Restore option.

Be sure you are running under DOS 3.3 from the System Master diskette that was supplied with your computer. Then type:

```
BRUN FID  RETURN
```

When the menu appears, select option 1—Copy Files. You are then prompted to enter the slot and drive numbers for the input and output disk. If you have only one disk drive, enter the same slot and drive number for both files. Once you designate the drive parameters, enter the first filename to be copied, *SECRET AGENT: MISSION ONE*. Now place your *A+ Disk Magazine* diskette in your default drive. If you have only one drive, press the RETURN key and the Apple will read your source file and write to your blank diskette. The screen prompts you to remove your source diskette and insert your blank diskette. If you have two disk drives,

place your blank disk in drive number two and press:

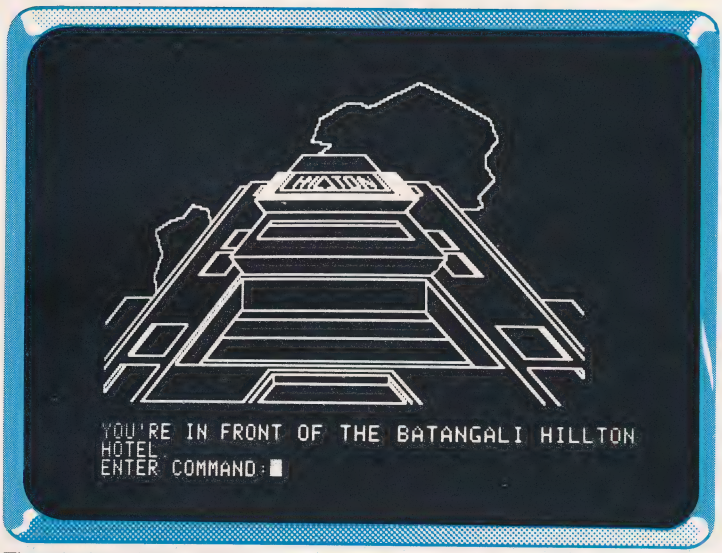
RETURN

to execute the copy. Follow the same procedure for the other files to be copied.

To run *SECRET AGENT*, you must be in Applesoft BASIC under DOS 3.3. Insert your work copy of the program into your default drive and type:

RUN SECRET AGENT: MISSION ONE RETURN

PLAYING THE GAME



The glorious Batangali Hillton

SECRET AGENT involves some luck and skill, but it is mostly a game of persistence. In each episode, you are presented with several problems and a variety of ways to solve these problems. Most of your attempts to find a solution lead to your death. Don't be deterred; if you restart the game and keep trying, you will eventually find the right solution. The ultimate goal of this game is to frustrate the user. (Please do not put your fist through your monitor.)

You should keep a pen and paper handy when you play. You may learn some things early on that you must know later in the game or in one of the other installments. Pay attention to your surroundings, because they often provide important clues. Finally, remember that this game tests stupidity as much as cleverness. When every intelligent solution fails, try something ridiculous, mundane, or just plain crazy.

Now you're on your own. Good luck.

NOTE

If you would like more information about *SECRET AGENT: MISSION ONE* or any of Jor-And's other products, or if you're stuck and need a hint, send your question(s), along with a stamped, self-addressed envelope, to:

JOR-AND
P.O. BOX 9180
GLENDALE, CA 91206

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Compare two disks byte-by-byte or file-by-file.

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The first in a series that will give you a comprehensive system for tracking your cash activity. Captures all cash transactions and organizes them to help you manage the flow.

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Find out if you can cut it in the business world. You'll find it's no piece of cake.

DEPRECIATION PAK
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PRODUCT REQUIREMENTS
- programs run on Apple II series computers using Apple DOS 3.3 and require min. 48K.
- Additional requirements, if any, listed with programs.

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2 - STATES AND CAPITALS

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GAMES

5 - SECRET AGENT 2

The mission continues with the second installment of SECRET AGENT. Search for clues that lead you to the headquarters of the evil Dr. Melton; then destroy his Energy Synthesizer.

UTILITIES

6 - AMPER UTILITY PAK

Applesoft BASIC is great stuff, but there always seems to be something you'd like to do in your program for which there simply isn't a command! Here are five new commands to expand your programming capabilities. Just load these utilities anytime and new program actions are yours.

7 - BASIC COMPARATOR

Ever wonder which is the latest version of that BASIC program you're working on? Or why the last version worked but the latest one doesn't? BASIC COMPARATOR looks at two BASIC program files on the same disk or on different disks and gives you a line-by-line list of the differences. Binary files can also be examined.

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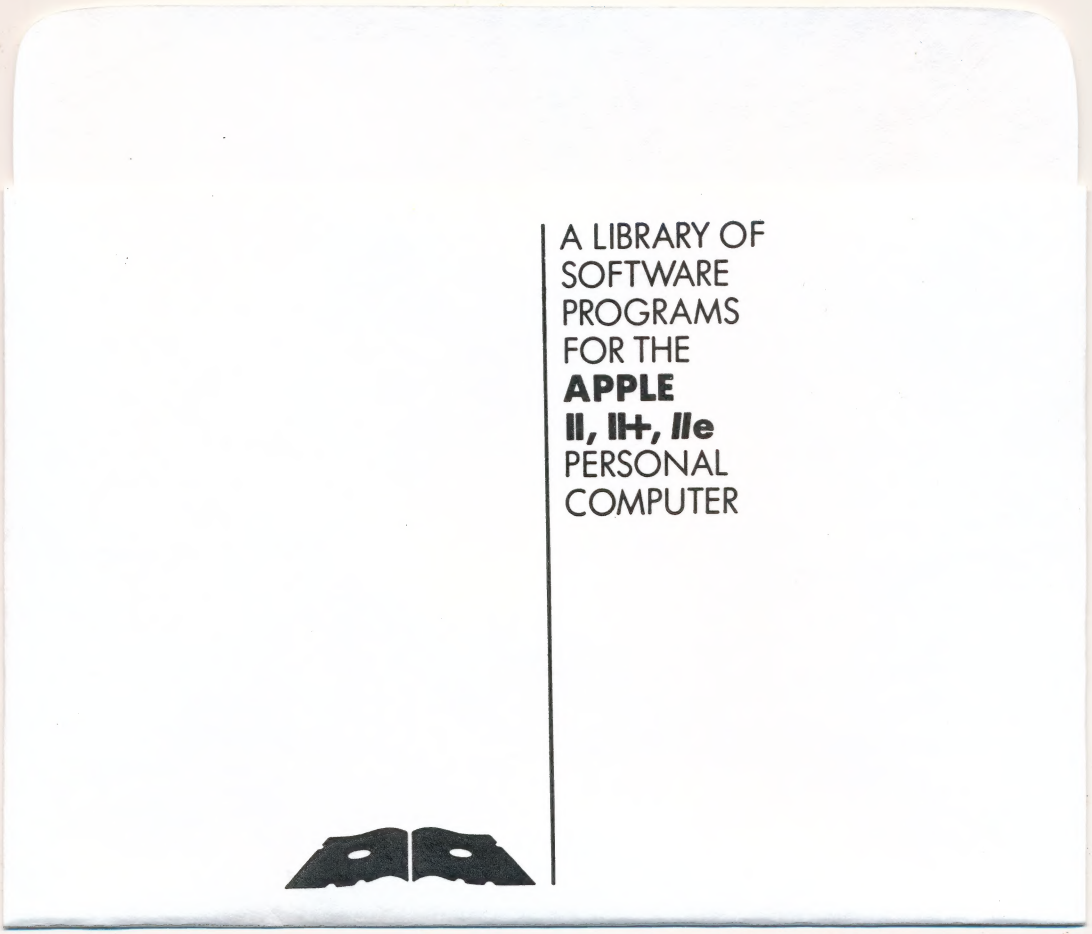
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